June 8, 1893.

The LORD KELVIN, D.C.L., LL.D., President, in the Chair.

Professor William Burnside, Professor Wyndham R. Dunstan, Mr. William Ellis, Professor J. Cossar Ewart, Dr. Ernest William Hobson, Sir Henry Hoyle Howorth, Mr. Edwin Tulley Newton, Dr. Charles Scott Sherrington, Mr. John Isaac Thornycroft, Dr. Alfred Russel Wallace, and Professor Sydney Young were admitted into the Society.

A List of the Presents received was laid on the table, and thanks ordered for them.

Pursuant to the notice given at the last meeting of the Society, the President proposed and the Senior Secretary seconded H.R.H. the Duke of York for election and immediate ballot. The ballot having been taken, His Royal Highness was declared duly elected a Fellow of the Society.

The following Papers were read :—

I. "Preliminary Report of the Joint Solar Eclipse Committee of the Royal Society, the Royal Astronomical Society, and the Solar Physics Committee on the Observations of the Solar Eclipse of April 16, 1893." By A. A. COMMON, F.R.S. Received June 7, 1893.

The Joint Committee have requested me to make the following brief report on the observations of the Eclipse. This will be followed shortly by a more complete report.

The Joint Committee was formed early in 1892, a grant of money was obtained from the Government Grant Fund of the Royal Society, and preparations were at once begun. After due consideration, it was decided to send out two observing expeditions, one to Fundium, on the Salum River, in Senegambia, and one to Pará-Curu, in the Province of Ceará, in the northern part of Brazil. With the exception of the work undertaken by Professor Thorpe, the whole of the observations were photographic. Three classes of work were undertaken at each station.

1st. Photographs of the corona, in continuation of a long and very complete series already taken with the "Abney" lens, and similar

photographs, on three times the scale, by means of a negative enlarging lens by Dallmeyer.

2nd. Photographs of the surroundings of the Sun by means of a prism in front of the object glass (prismatic camera).

3rd. Photographs of the spectrum of the corona by slit spectroscopes.

The West African Expedition was placed in charge of Professor Thorpe, F.R.S. Professor Thorpe, assisted by Mr. Gray and Mr. Forbes, undertook the determination of the photometric intensity of the coronal light on the method he used at the Solar Eclipse of 1886, at Granada. A complete and satisfactory number of observations were made.

Mr. A. Fowler undertook the prismatic camera observations, using a 6-in. telescope, lent by Mr. Lockyer, with a large prism in front of the object glass. Mr. Fowler took six plates before and after totality, and fifteen during totality. The photographs are considered by Mr. Lockyer, at whose wish this investigation was made, to be of very great value.

Sergeant Kearney, R.E., had charge of the coronagraph. With the Abney and Dallmeyer lenses and a double camera, eleven pictures of the corona were secured, and these are of a most satisfactory character.

Captain E. S. Hills, R.E., undertook the slit spectroscopes, and obtained two excellent photographs.

Mr. A. Taylor and Mr. Shackleton formed the expedition to Brazil. The coronagraph was placed in the charge of Mr. Taylor, as well as the slit spectroscopes, to be used if the necessary local help could be obtained. Twelve photographs of the solar corona were obtained, of a similar character to those obtained in Africa, and directly comparable with them as regards exposure, density, and detail of the coronal structure. Most of these coronal plates have Captain Abney's density squares impressed on them for determining the density of the photographic image. Two photographs with the slit spectroscopes were obtained.

Mr. Shackleton, with an arrangement somewhat similar to that employed by Mr. Fowler, took a large number of photographs; these are only less valuable than the African photographs in that the instrument employed was on a smaller scale.

The air at Fundium was hazy. At Pará-Curu the observations were made under peculiarly fortunate circumstances, as the Sun was clear of clouds only for a short time about the time of the Eclipse.

Generally speaking, the results obtained are of a most satisfactory character. The photographs taken at each station provide a large amount of material to work upon, particularly those by the prismatic camera. From the distance apart of the two stations and the dupli-

cation of the work, a comparison may throw some light on the question of change of form and nature of the surroundings of the Sun during the interval between the observations. In this respect we may have the photographs taken in Chili to further extend this time interval.

The various members of the expeditions have enjoyed good health, and no one seems to have suffered injury from the excessive heat.

The Committee are under great obligations for much assistance given to the expeditions. The work of observation in Africa was made on French territory. The French Government did everything possible in granting a choice of sites, and M. Victor Allys, the French Administrator at Fundium, gave most valuable help.

The Admiralty have given us a gunboat to take the party up the Salum River and attend on them during the time this work lasted, and a cruiser brought the party from Bathurst to Grand Canary. The value of the help afforded by the Admiralty can be appreciated when it is known that without it this expedition could not have been sent.

From many other quarters most valuable aid has been received, and will be more fully acknowledged in the General Report.

II. "On the Bright Bands in the present Spectrum of Nova Aurigæ." By WILLIAM HUGGINS, D.C.L., LL.D., F.R.S., and Mrs. HUGGINS. Received May 29, 1893.

Some few prefatory words are called for in explanation of the partial incompleteness of the present communication.

A considerable brightening, from below the 14th magnitude to above the 10th magnitude, was found to have taken place in the Nova when it was re-observed in the early part of August, 1892, and to be accompanied by a modification of its spectrum, apparently analogous to a similar change in the spectrum of Nova Cygni in 1877, since the observations we made of the star on March 24, 1892, when it had fallen to nearly the 11th magnitude.*

In consequence, however, of the removal of the eye-end of the telescope to the workshops of Messrs. Troughton and Simms for the attachment to it of the mounting for a fine Rowland grating by Mr. Brashear, we were without the means of observing the star and its spectrum during the whole of the autumn and the early winter. It was not until the beginning of the year that the new spectroscope was mounted in our observatory, and then, from some instrumental causes of delay and from a prevalence of bad weather, we were

* 'Roy. Soc. Proc.,' vol. 51, p. 492.